

Executive Registry
66-263C

10 June 1966

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Dear Cy:

May I express the appreciation of the Agency and my own personal gratitude for the splendid trip to the Quick Reaction Laboratory today.

I was greatly impressed with the competence and wide-aware attitude of all your people, and it certainly seems they are doing a fine job.

I was also happy to learn that considerable liaison has existed for some time between our boys and yours at the lab. At the same time, however, I noted that my lads made copious notes of items of possible interest because they were for the first time being introduced to these items.

We certainly want to continue to work closely with you and be of any help we can in collateral research. At the same time we know we will benefit in matters of our specific interest and responsibilities.

As you know, it is a pleasure to do business with you.

Warmest best wishes.

Sincerely,

Army review(s) completed.

✓ *panel* W. F. Raborn

Lt. General A. W. Betts, USA
Chief of Research and Development Headquarters
Department of the Army
Washington, D. C. 20310

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(EXECUTIVE REGISTRY FILE *Armen*)



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U.S. ARMY LIMITED WAR LABORATORY

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The U. S. Army Limited War Laboratory Headquarters building has been dedicated YORK HALL in recognition of Captain Don J. York—Graduated from USMA, 1954. Killed in action July 14, 1962, while serving as U. S. Advisor to the 3rd Airborne Battalion Vietnamese Army.

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Introduction

The deterring effect of the nuclear capability of both the United States and the U.S.S.R. changed the philosophy of war during the 1950's. Any aggressive power with ideas of expanding its sphere of influence was no longer willing to use military force openly and risk starting a war that could eventually end in the use of nuclear weapons. So, while the nuclear deterrent discouraged open warfare, it also brought about an increase of subversive insurgency.

With the increase of the number of widespread incidents of subversive insurgency, most of which occur in underdeveloped countries, the U. S. Army found that its forces, equipped with the most modern materiel of war, required additional, specialized equipment in order to effectively combat the subversive insurgency in a geographic and political environment where a man and a rifle are the most important ingredients in the expansion of the sphere of influence.

This situation caused the Defense Department to study these changed conditions and determine what was needed to combat this type of warfare. One of the recommendations was for the establishment of a R&D laboratory with a "quick reaction" capability of producing items of materiel expressly designed for use in combating subversive insurgency in underdeveloped countries. From this recommendation, the U. S. Army Limited War Laboratory evolved. It was activated on 15 June, 1962, as a Class II activity under the command of the Chief of Research and Development with station at Aberdeen Proving Ground, Maryland. Staff responsibility has been delegated to the Chief, Special Warfare Division, Office of the Chief of Research and Development.

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Mission

To provide a centralized Research and Development activity with a quick reaction capability for meeting Army operational requirements relating to limited war, particularly to war of low intensity in underdeveloped or remote areas of the world. This includes specifically the provision of a quick-reaction facility for accomplishing short-range development of specialized limited warfare items. It is responsible for the generation of new ideas for materiel items to improve the effectiveness of military personnel committed to limited warfare actions.

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Personnel

The present personnel of the Laboratory total 146. Civilians account for 134 spaces and military, 12 spaces. The civilians were selected not only because of their specialized expertise but also for the depth and variety of research experience and the quality of their imaginative and creative thinking. These project engineers when given a problem, conceive the solution, develop the item, take it through complete testing and may accompany it to Vietnam for demonstration or training of the first troops in its use. The 12 military spaces are primarily staffed by combat arms officers who have completed recent assignments in counterinsurgency environments. It is their knowledge of the environment and conditions that guides the engineers in developing materiel that will meet the requirements of a specific area. It also is their responsibility to maintain close liaison with the Special Warfare Agency and the Special Warfare and Civil Affairs Group of the Combat Developments Command.

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Telephone Extension

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Technical Director Edward K. Kaprelian.....	3998
Executive for Administration Peter M. Anderson.....	4473
Chief, Operations & Analysis Division Lt. Colonel J. F. Matteson.....	4191
Chief, Development Engineering Division John C. Ackerman.....	5104
Chief, Applied Research Division Milton Cutler	4272
Chief, Technical Support Division Peter B. Ferrara.....	5105

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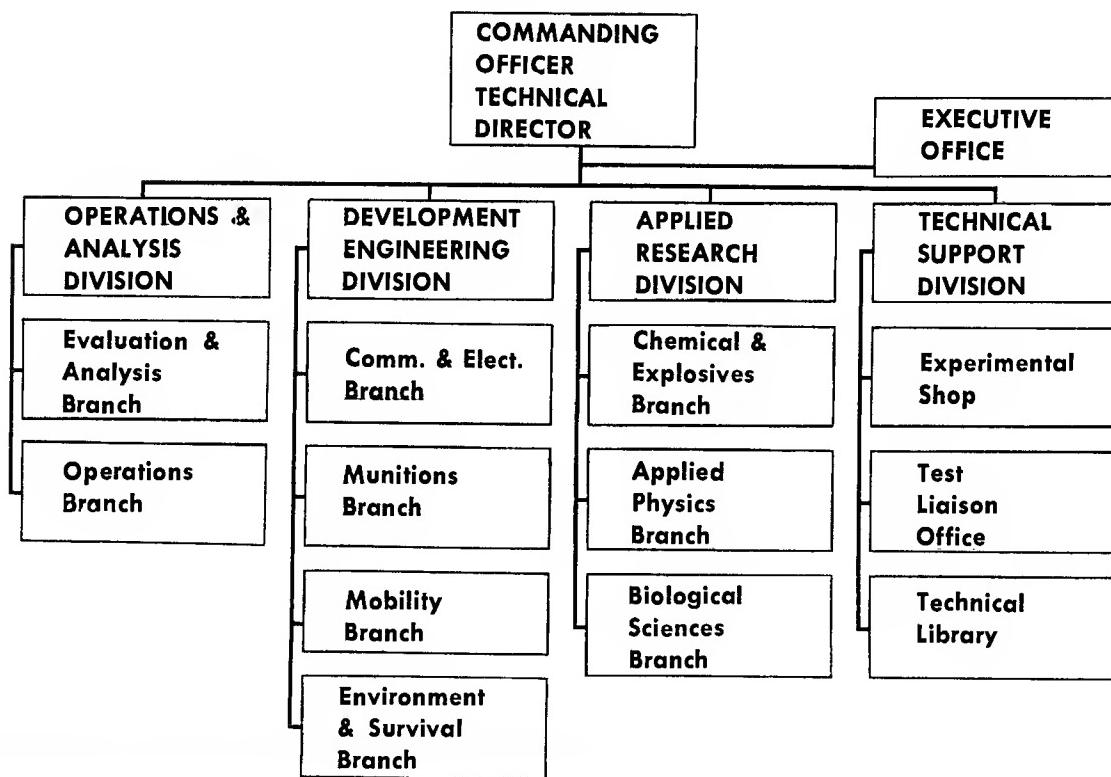
Organization

The straight forward organizational structure of the Laboratory provides direct communication so that work can move at a rapid pace. The personnel are few in number but each is competent in two or more technical areas or scientific disciplines thereby achieving the flexibility necessary for "quick reaction" in the development of urgently required materiel for the forces engaged in limited warfare.

The Laboratory is in constant contact with the troops through a liaison man in the field who keeps the Laboratory informed of the needs of the troops and demonstrates new items from the Laboratory to the users in the field. The liaison man is one of the more important single factors in determining user needs and in assuring the items developed fulfill a legitimate need and meet the conditions of the user and his environment. As the organization chart shows, the Laboratory has a branch which is the counterpart of each major Army R&D Laboratory. These are, of course, only tiny miniatures of the principal labs and are concerned only with short range development of materiel items needed immediately by troops committed to limited war. The basic philosophy of the Laboratory is not to find the ultimate solution to a problem but to develop the best solution possible in the time frame of 18 months or less. Assisting the troops in fighting today's battles is the prime mission of the Laboratory; the optimum item of materiel will be developed by the major R&D laboratory responsible for the field of interest.

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U S ARMY LIMITED WAR LABORATORY



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While the organization chart shows sharp lines of demarcation of responsibility, in practice the Laboratory has an unusual flexibility. Because of the smallness of the organization and the wide diversity of scientific and technological disciplines, several branches of both the Development Engineering and Applied Research Divisions will work together on a complex problem. The housing of so many disciplines under one roof greatly contributes to the efficiency of the Laboratory and is a significant factor in quick-reaction. Both the Operations and Analysis and Technical Support Divisions back up the work of all branches; the Evaluation and Analysis Branch providing an assessment of the merits of an idea, the Operations Branch contributing knowledge from first-hand experience in the field, and the Experimental Shop designing and fabricating mock-ups, models or prototypes of hardware for tests or feasibility. No person is involved in just one job; he is helping others with theirs while being helped by others. This cross-fertilization approach brings deep involvement in the work and tends to breed an unusual dedication of effort.

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Some Representative Developments

On the following pages are pictured and described a few representative items developed by the Laboratory.

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Cargo/Personnel Lowering System

The cargo/personnel lowering system consists of a governor which resembles a miniature aluminum ladder, 150 feet of $\frac{3}{8}$ " nylon rope, a personnel harness and a carrying case.

The system was developed for the purpose of lowering personnel or up to 500 pounds of cargo from a hovering helicopter in areas where the helicopter is unable to land or to lower a parachutist to the ground quickly after a tree landing.

The system works on the principle of rope friction. One end of the rope is laced through the governor—the number of lacings depends on the amount of weight being lowered—the end of the rope is then fastened to an anchoring point in the helicopter, or in the case of a parachutist, to his parachute risers or to the tree. The governor is next hooked to the ring in the personnel harness and the soldier allows the rope to feed out of the carrying case, through his hand and through the governor. He can slow his descent or stop at any time merely by applying a slight pressure with his thumb and forefinger. The complete system, including harness, weighs only $7\frac{1}{4}$ pounds.

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Signal, Ground Smoke

The signal, ground smoke, was developed to provide personnel engaged in counterinsurgency and limited war operations with a small, short duration smoke signal.

While the Army inventory contains the standard M8 white and M18 colored smoke grenades which could be used for signaling, these were deemed too heavy and sometimes produced more smoke than was needed for a particular operation.

The signal, ground smoke, consists of a pyrotechnic smoke pellet wrapped in aluminum foil and packaged in an aluminum container with a screw cap. It is ignited by a simple scratch block and igniter pellet. The cartridge burns for approximately 18 seconds and produces a smoke cloud which is visible to aerial observers at an altitude of 1000 feet and a slant range of about one mile. Because of its small size and light weight (1.1 oz), a soldier can carry 16 of these cartridges and still not have the weight of one M8 smoke grenade.



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Position Locator

The position locator is a compact device for use by both conventional and counterinsurgency forces in any type of terrain to locate themselves geographically with respect to other known locations. The device is self-contained and is independent of any base station. The system is based upon the repeated determination of an individual's stride length. This distance is resolved into east-west and north-south components with the aid of heading information derived from a magnetic compass. These coordinates are then continuously added to present position, expressed in grid coordinates, to provide a continuous display.

The final configuration will weigh no more than 10 lbs and will be worn by foot soldiers without impairment of normal functions. It will operate continuously for 40 hours before battery recharging. The packaging is designed to survive parachute drop or rough handling.

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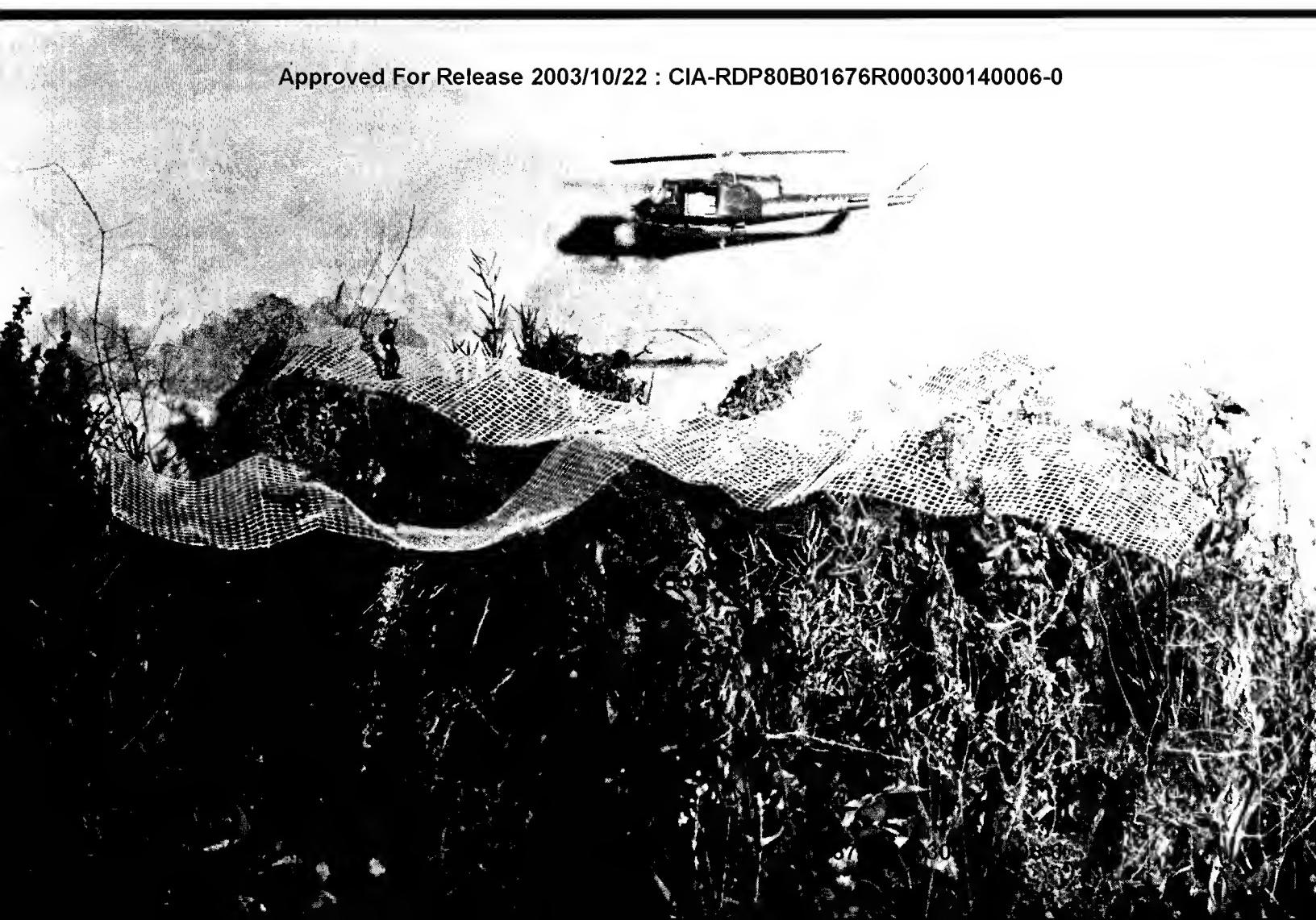
Lightweight Water Purification Unit

The lightweight water purification unit was developed to provide troops a supply of pure water in areas where water is polluted, brackish or mineral laden. The unit consists of a tubular boiler and tubular condenser of pliable plastic film materials. The boiler is four inches in diameter and five feet long, made of silicone rubber-coated fiberglass fabric. The boiler is provided with a silicone rubber fiberglass fabric connecting tube which has a quick-connect coupling to which the condenser is connected. The condenser is a length of thin film clear plastic tubing (sausage casing) five inches in diameter and 20 feet or more in length. The distiller operates from the heat of any small fire built directly beneath the water filled boiler. Incorporated in the boiler is a filling valve through which raw water may be added during operation to maintain the water level within the boiler. As distillate collects in the condenser, convenient lengths for carrying may be cut off and tied for transport or storage.

The unit produces $\frac{1}{2}$ gallon of distilled water per hour and weighs $1\frac{1}{2}$ pounds.

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Jungle Canopy Platform

The jungle has always been an asset to the native guerrillas since they are familiar with it and it impairs our modern mobility. After much thought on how to overcome this advantage, it was decided that since the jungle could not be gotten rid of, the only thing to do was to make it work for us.

The Laboratory devised a canopy platform system consisting of two steel nets, 200 feet long and 20 feet wide, which are laid, by helicopter, across the tops of the trees in the form of a cross and an 18 foot hexagonal platform which is placed on the intersection of the nets. The nets can be laid on the canopy in five minutes ready for troops to off-load from a helicopter.

The platform, which can be put in place in another 5 to 10 minutes, contains an integral power hoist that is used to lower supplies and equipment to the jungle floor and raise casualties to the platform for quick evacuation. The platform can also be used for an observation post or a radio relay station.

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Smoke Screen Troop Landing

The smoke screen troop landing system was developed for the purpose of concealing heliborne troops being landed in areas occupied by the enemy.

The system consists of two XM3 2.75" rocket launchers fitted with an easily mounted adaptor which permits the controlled release of a total of 288 standard AN-M8 smoke grenades. The adaptor is a $\frac{3}{8}$ " thick aluminum plate with holes to match each launcher tube and is attached to the launcher by four clamp fittings. A trip gate, opened by a solenoid actuated release mechanism, is mounted on the plate across the ejection end of each tube.

An intervalometer control box in the pilot's compartment regulates the release of the grenades for various aircraft speeds. At an altitude of 200 to 300 feet and a speed of 50 to 90 knots, the system will lay a smoke screen more than 3000 feet long.

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HF Radio for Jungle Use

The AN/PRC-64 is a lightweight HF radio, designed to provide communications for long range infantry patrols engaged in jungle warfare or counterinsurgency operations.

It gives the best results while operating to a high power base station. The radio weighs only 10½ pounds which includes a 2½ pound spare battery, a carrying case and other accessories. The radio communicates by voice and CW with reliable ranges of 150 miles voice and 300 miles CW. However, as with any HF radio vertical incident sky wave does not always provide good communications at short ranges. It has four crystal controlled channels in the 2.2 to 6 megacycle frequency range. Other desirable characteristics include burst transmission, whisper voice, a battery condition indicator and just recently a narrow bandwidth receiver addition has resulted in a decided improvement in the radio. The transmitter power output for the PRC-64 is 1.5 watts on AM voice and 5 watts on CW. A miniature microphone and two earphones are supplied with each set.

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Other Items Developed During the Past Two Years

Grenade Dispenser

A device for dispensing standard M26 grenades from the H-21 helicopter to suppress small arms ground fire.

Mobility Augmentation of M113

The M113 cannot climb the steep banks of canals and rice paddies. A sea anchor was substituted for the earth auger and deadman which were previously being used with the capstan and cable system. The anchor sinks itself into the ground and reduces the time for getting an M113 out of a canal from about 1 hour to about 5 minutes.

Balloon-Borne Communication System

A balloon raises the radio antenna above the terrain to increase the normal 2 to 3 mile range of the PRC-10 radio to a minimum distance of 30 miles over adverse terrain and foliage.

M113 Searchlight

A searchlight adapted to the M113 armored personnel carrier to give it a night time illumination capability.

Shotshell Adaptor

An adaptor for the M79 grenade launcher which allows shotgun shells to be fired thereby giving the M79 a close-in kill capability.

Individual Aid & Survival Kit

Compact, lightweight survival kit for hot-wet environment.

Load Carrier

The load carrier is a man-propelled, one wheel cart operated by two men. It is designed to traverse adverse terrain such as swamps, rice paddies, heavy vegetation and narrow jungle trails. It has a 250-lb payload capacity.

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Fuel Transfer Unit

A lightweight system consisting of a pump and a $\frac{3}{4}$ HP gasoline engine was developed to rapidly transfer fuel from 55 gallon drums to aircraft.

Aircraft Released Smoke Marker

A long burning smoke marker for marking targets of opportunity, drop zones and landing zones.

Leech Repellent

An effective leech repellent that withstands wash-off, from clothes or skin, for periods up to twelve hours.

Free-Drop Water Container

A three gallon water container made of eight ply plastic tubing which can be free-dropped from aircraft at 500 feet for supplying troops with drinking water.

Utility Shelter

A lightweight, air transportable, easily erected shelter designed to provide protection from heat, rain and insects for personnel performing duties in the shelter.

Scout Armor Kit

An armor kit for the International Harvester Model 80 Scout Vehicle that can be installed in the field.

Packet Subsistence, Long Range Patrol

A lightweight food packet (10 oz.) which needs only a canteen cup of hot water and 20 minutes (30 minutes for cold water) to prepare a 1,000 calorie meal.

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